FILTER STRIP WORKSHEET
2005 Surface Water Design Manual Sizing Method

Project:

METHODS OF ANALYSIS (Section 6.3.1.1)

Step 1) Calculate design flows

Filter strips usually precede other water quality facilities (See menus in 6.1)

Two-year flow	$Q_{2\text{-}yr}$	_____	(cfs)	See 3.2.2 KCRTS Method
Water quality design flow	Q_{wq}	_____	(cfs)	"

Step 2) Calculate design flow depth

Q_{wq}=	water quality design flow	_____	(cfs)	Calculated in Step 1
n_{wq} =	Manning's roughness coefficient	_____		Use 0.35 or 0.45, see p. 6-59
W =	width of strip along imperv.	_____	(ft)	Determine now
s =	longitudinal slope along path	_____	(feet/ft)	Determine now

$$d_f = \left| \frac{Q_{wq}\, n_{wq}}{1.49\, Ws^{0.5}} \right|^{0.6}$$ design flow depth _____ (ft) Manning's formula, re-arranged

If the design flow depth is greater than I inch (0.083 ft), the flow must reduced, the strip width must be increased, or a different WQ facility must be used.

CHECK: _____ (ft) < 0.083 ft, OK

Step 3)Calculate the design flow velocity through the strip

Q_{wq}=	_____	(cfs)	From step 1
W =	_____	(ft)	From step 2
d_f =	_____	(ft)	From step 2
$V_{wq} = Q_{wq}/Wd_f$	_____	(fps)	Flow Continuity Eq. w/ Wd_f for A

If V_{wq} exceeds 0.5 f/s, a filter strip may not be used. Redesign site to use a gentler longitudinal slope, or use another WQ facility.

CHECK: _____ (fps) < 0.5 fps, OK

Step 4) Calculate length of filter strip

hydraulic residence time =	540	(s)	Required 9 minutes
v_{wq}= design flow velocity	_____	(fps)	Calculated in Step 3
$L = 540\, v_{wq}$	_____	(ft)	

Size Summary

Land area is needed for the strip, access, & area outside the treatment area to convey high flows

Other Criteria

Flow spreading & energy dissipation

Access

Soil amendment

Planting requirements

Liners (Section 6.2.4)

Recommended design features p. 6-61